

Subin Roy Varghese

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Education

University of Houston

Ph.D., Electrical Engineering

Dissertation: Vision-Language AI Scene Analysis for Large Scale Engineering Applications

Houston, TX

December 2025

University of Houston

M.S., Engineering Data Science

Houston, TX

December 2021

University of Houston

B.S., Mechanical Engineering

Houston, TX

August 2018

Experience

Sharp Vision Software

Houston, TX

Head of AI and Software Development

February 2023 – Present

- Secured \$3M research funding from Department of Health for LLM-powered medical simulation platform (commercialized).
- Reduced deployment time by 4 months through SaaS platform re-architecture for medical training simulation.
- Engineered secure AI deployment pipeline for U.S. Navy Fleet Readiness Center.
- Built large-scale ETL pipeline for multimodal data processing across medical and engineering AI applications.
- Established company-wide DevOps infrastructure for iOS, Android, web, and local deployments.
- Integrated custom CV/ML models for on-device tasks in Unity, Unreal Engine, and native iOS applications.

University of Houston - Structure and Artificial Intelligence Lab

Houston, TX

Graduate Research Assistant

December 2020 – December 2025

- EMI 2023 Best Paper Award: Pioneered generative AI for controlled structural damage synthesis using cycle-consistent GANs.
- ICCV 2025: Created first multimodal change detection method enabling cross-dataset training.
- Released largest change detection dataset (CSeg): 500K+ synthetic pairs, 300K+ text prompts.
- Built first scene graph dataset for infrastructure inspection (200 bridges, component-level condition ratings).
- Achieved human-level accuracy in automated bridge inspection using Embodied AI.
- Deployed neural radiance field-based anomaly detection for Navy REPTX 2022 (12K+ images processed).

Publications

- ViewDelta: Scaling Scene Change Detection through Text-Conditioning (ICCV Workshop on Sustainability with Earth Observation & AI 2025)
- Unpaired image-to-image translation of structural damage (Advanced Engineering Informatics, EMI 2023 Best Paper Award)
- Visual Damage Modeling with Physics-informed and Generative Models (Conference on Applied AI and Scientific Machine Learning)
- View-Invariant Pixelwise Anomaly Detection in Multi-object Scenes (under review)
- Large Scale Infrastructure Monitoring with Embodied AI (under review)

Skills & Interests

Programming Languages: Python, C++, C, C#, Swift, JavaScript, MATLAB, R, CUDA

AI/ML Frameworks: PyTorch, TensorFlow, Hugging Face, OpenCV, scikit-learn, DeepSpeed, PyTorch Lightning

Cloud & Infrastructure: AWS, Azure AI, Google Cloud, Vertex AI, Docker, SLURM

Research Interests: Vision-Language Models, Generative AI, Embodied AI, Computer Vision for Infrastructure Inspection, Human-Robot Collaboration